

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A layered article of manufacture, comprising a substrate; a biaxially textured MgO crystalline layer having the c-axes thereof inclined with respect to the plane of the substrate; a layer of one or more of YSZ or Y_2O_3 ; a layer of CeO_2 ; and a crystalline superconductor layer, said crystalline superconductor having the c-axes thereof normal to said substrate.
2. The article of manufacture of claim 1, wherein said substrate is metallic or a ceramic.
3. The article of manufacture of claim 2, wherein said biaxially textured MgO layer is directly in contact with said metallic substrate and the c-axes of said MgO layer are inclined up to about 40° from said metallic substrate normal.
4. The article of manufacture of claim 3, wherein the c-axes of said MgO layer are inclined between about 20° and about 35° with respect to said substrate normal.
5. The article of manufacture of claim 3, wherein said YSZ layer is directly in contact with said biaxially textured MgO layer and substantially coextensive therewith.
6. The article of manufacture of claim 5, wherein said CeO_2 layer is directly in contact with said YSZ layer and substantially coextensive therewith.
7. The article of manufacture of claim 6, wherein said crystalline superconductor layer is directly in contact with said CeO_2 layer and is selected from the family of YBCO superconductors.

8. The article of manufacture of claim 7, wherein said metallic substrate is a Ni alloy.

9. The article of manufacture of claim 8, wherein said metallic substrate is non-biaxially aligned.

10. The article of manufacture of claim 1, wherein said substrate is a tape.

11. The article of manufacture of claim 1, wherein said substrate is arcuate.

12. The article of manufacture of claim 11, wherein said substrate is a wire.

13. A layered article of manufacture, comprising a metallic substrate; a biaxially textured MgO crystalline layer on said metallic substrate, said MgO having the c-axes thereof inclined with respect to the normal to the substrate in the range of from about 10° to about 40°; a layer of one or more of YSZ or Y₂O₃ on said MgO crystalline layer; a layer of CeO₂ on said layer of one or more of YSZ or Y₂O₃; and a crystalline superconductor layer on said CeO₂ layer, said crystalline superconductor having the c-axes thereof normal to said metallic substrate.

14. The article of claim 13, wherein said biaxially textured MgO crystalline layer is up to about 2 microns thick.

15. The article of claim 13, wherein said YSZ or Y₂O₃ layer is up to about 1 micron thick.

16. The article of claim 13, wherein said CeO₂ layer is up to about 30 nanometers thick.

17. The article of claim 13, wherein said crystalline superconductor is selected from the family of YBCO superconductors.

18. The article of claim 13, wherein said substrate is arcuate.
19. The article of claim 13, wherein said biaxially textured MgO crystalline layer is directly in contact with said metallic substrate and having a homoepitaxial layer of MgO thereon and said YSZ layer in contact with said homoepitaxial layer of MgO and is up to about 2 microns thick, said YSZ layer is in direct contact with said CeO₂ layer and is up to about 1 micron thick, said CeO₂ layer is in direct contact with said superconductor layer and is up to about 30 nanometers thick, and said crystalline superconductor is selected from the family of YBCO superconductors.
20. The article of claim 19, wherein the c-axes of said crystalline MgO layer are inclined from about 20° to about 35° with respect to the normal to said metallic substrate.
21. The article of claim 13, wherein said article is a tape.
22. The article of claim 13, wherein said article is a wire.
23. A method of making a layered article of manufacture, comprising providing a substrate; depositing a biaxially textured MgO crystalline layer on the substrate by the inclined substrate deposition (ISD) method, the MgO having the c-axes thereof inclined with respect to the substrate normal; depositing a layer of one or more of YSZ or Y₂O₃ on the biaxially textured MgO crystalline layer; depositing a layer of CeO₂ on said layer of one or more of YSZ or Y₂O₃; and depositing a crystalline superconductor layer on the CeO₂ layer, the crystalline superconductor having the c-axes thereof normal to the substrate.

24. The method of claim 23, wherein at least some depositions are carried out by the pulsed laser deposition method.
25. The method of claim 23, wherein the plume of the MgO ions are inclined between about 25° and about 70° with respect to the plane of the substrate normal.
26. The method of claim 23, wherein the angle of the plume of MgO ions inclined $35^\circ \pm 10^\circ$ or $60^\circ \pm 10^\circ$ with respect to the substrate normal.
27. The method of claim 25, wherein relative rotational movement is provided between the substrate and the source of one or more layers.
28. The method of claim 27, wherein the substrate is rotated during at least some of the depositions to produce a wire.
29. The method of claim 23, wherein the YSZ and/or the CeO₂ layer is deposited by a method other than ISD.
30. The method of claim 23, wherein the YSZ and/or the CeO₂ layer is deposited by ISD.